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Epidemiology of the Relationship Between Traumatic Experience and Suicidal Behaviors

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Although much has been written about the association of traumatic experiences with the development of psychiatric morbidity, less is known specifically about the relationship between trauma and attempted suicide or suicide. Attempted suicide and suicide are outcomes with a complex etiology, and the risk factors for each vary across the life course, by gender, and by culture. At the same time, attempted suicide and suicide form a public health problem of enormous significance, reaching beyond the tragic death or injury of the individual to have a lasting impact on family, friends, and coworkers (Knox, Conwell, & Caine, 2004). For example, in several of our studies, up to 65% of individuals report knowing someone who has died by suicide. The actual total public health burden due to suicidal behaviors has never been quantified, but is likely enormous.

It is imperative to note that there are a number of known challenges with regard to case definition of suicide that potentially introduce bias into any study that includes this outcome. For example, there is considerable variation among states in this country as to who is mandated to report a death from suicide, ranging from coroners' offices to the reporting physician at the time of death. The coding of mortality data changed significantly in 1999 (from ICD-9 to ICD-10), so that the number of deaths and death rates due to suicide and accidental death before 1999 and after may not be readily comparable (Hoyert et al., 2001). In 2003, the National Center for Health Statistics further revised the ICD-10 Injury Mortality Matrix to finalize groupings of ICD-10 external cause of injury classifications, affecting groupings related to both suicide and motor vehicle accidental deaths.

Finally, there is an ongoing debate regarding how best to achieve a better understanding of the potentially diverse ways that clinicians and researchers may define suicidal behaviors, and how these discrepancies in nomenclature should be addressed. Further limitations may exist due to the presence of unknown bias caused by misclassification of accidental deaths, some of which may in fact be deaths due to suicide. Many of the studies on trauma and suicide rely on self-reported data of an attempted suicide. Currently, there is no central registry of attempted suicide events in the United States that might serve to validate studies that use suicide attempts as an outcome that may occur years after exposure to trauma. Despite these limitations, a growing number of studies suggest that previous trauma is associated with an increased risk of suicidal behaviors (Afifi et al., 2008; Brodsky et al., 2001; Ryb et al., 2006; Sarchiapone et al., in press).

Studies in the general population have found that trauma appears to have reverberating effects that may result in suicidal behaviors, including death by suicide, decades following the exposure. Trauma during childhood has a cascading effect later in life, confirmed by the expanding body of literature that demonstrates an elevated risk for suicide for both genders. A modest but compelling body of research has examined the relationship between suicide and traumatic experiences related to military service, including captivity and peacekeeping. Caution must be taken in extrapolating these studies to the general population, since the definition and measurement of trauma in them frequently differ from those covering studies of trauma in civilians. However, studies in military populations are important to include for review, since early studies found that in war amputees the suicide rate was 37% higher than for the general population (Bakalim, 1969). A similar magnitude of risk has also been reported in studies of former World War II prisoners of war (Keehn, 1980). Certain populations may bear excess risk for attempted suicide and suicide following exposure to trauma. High-risk subgroups

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might include incarcerated individuals, victims of domestic violence, those with substance use disorders, those with physical trauma, or victims of natural disasters. Although not exhaustive, three categories (childhood-related trauma, war zone related trauma, and selective populations exposed to trauma) will serve as a framework for this review to begin to capture the knowledge base on the epidemiology of trauma and suicidal behaviors.

Childhood Trauma

Some of the best evidence for a relationship between trauma and suicide is based on research on early experiences of physical, emotional, and sexual abuse. Most of the published work supports that these types of adverse childhood experiences, particularly sexual abuse, are risk factors for suicide (see, for example, Nelson et al., 2002; Ystgaard et al., 2004). In a study in which attributable risk fractions were estimated for these types of childhood traumatic experiences, the magnitude of the estimates ranged from 64% to 80% for lifetime, adult, and childhood/adolescent suicide attempts (Dube et al., 2001). This means that up to 80% of the risk for suicide would be eliminated if the abuse during childhood was eliminated. These findings strongly suggest that targeting prevention of childhood trauma may interrupt an important negative trajectory during development that may end in a suicide attempt.

The limitations of these studies on childhood exposure to trauma and attempted suicide largely are related to the retrospective design that most have employed, which inherently can lead to reporting bias. In addition to the variation in how suicide is defined, as discussed earlier, many of these studies use a wide range of definitions and measures of childhood traumatic experiences. However, more recently, investigators have begun to explore the biological plausibility for a relationship between childhood trauma and suicidal behaviors. Roy et al. (2007) found that in a clinical population with substance dependence, childhood trauma interacts with low expression of the serotonin transporter gene variation to increase the risk of suicidal behavior. Other studies have examined the role of familial transmission of suicidal behavior (Brodsky et al., 2008). In a study of 83,731 students, Eisenberg et al. (2007) found an increased risk of suicide for youth with a childhood history of sexual abuse, but when protective factors were accounted for (family connectedness, teacher caring, other adult caring, and school safety), the predicted probabilities for suicidal behaviors were substantially reduced. These authors concluded that modifying select protective factors, in particular family connectedness, potentially would reduce the risk of suicide in adolescents with a childhood history of sexual abuse. Finally, Brodsky and Stanley (2008) provide a recent review of some of the theoretic models that have been used to understand the underlying mechanisms through which early childhood trauma plays a role in suicidal behavior. They also include a discussion on the neurobiologic correlates of trauma and suicidal behavior.

Wartime Trauma

A number of studies have examined the role of war zone trauma and suicide attempts and suicide, particularly in Vietnam-era veterans. Some of these have shown a relationship between combat experience and suicide (Bullman & Kang, 1994; Hendin & Haas, 1991), while others have not (Farberow et al., 1990; Thomas et al., 1991). One particularly significant study from the Vietnam era provides evidence of a dose-response effect between the degree of traumatic injury suffered as part of deployment and suicide risk (Bullman & Kang, 1996). An observation of a dose-response effect is one of the strongest types of epidemiologic evidence; however, few studies of trauma and suicide attempts achieve this level of rigor. The major challenge in studying a putative role for wartime exposure has been the ability of investigators to develop explicit measures of the trauma exposure itself. For example, most investigators agree that war zone trauma exists along some sort of continuum, which might be captured by envisioning the role the veteran played in the traumatic event: as target, observer, agent, and failure (see Fontana et al., 1992). Under this framework, killing or having failed to prevent death and injury was more strongly related to suicide attempts than the other roles. Other investigators have approached the measurement of traumatic events during wartime through the development of distinct categories of types of trauma experiences, such as handling dead bodies versus observation of atrocities. Despite these challenges, several studies from the Vietnam era demonstrate that during the early follow-up period following the Vietnam War, Vietnam veterans were at an elevated risk for attempting suicide or taking their own lives (Centers for Disease Control, 1987); although a 30-year follow-up of the same cohort found that this elevated risk did not persist over time (Boehmer et al., 2004). However, in another study, veterans with PTSD continued to be at heightened risk for dying from suicide 30 years after the end of service (Boscarino, 2006). Adams and Lehnert (1997) reviewed studies that examined suicidal behavior within the context of prolonged trauma due to combat trauma and previous child abuse.

A major limitation of these studies in veterans is that it is difficult to ascertain, especially for those suffering from substance abuse or depression, the specific contributions of war-related trauma exposure. This is due to the lack of prospective studies that would provide data on relevant childhood exposures to trauma before entry into the military, or deployment to a war zone. A good example of the complexity of the issue is illustrated by studies in women veterans. Women veterans have high rates of childhood abuse histories and military-related sexual and physical assault. Increasingly, women in the military are exposed to combat and related traumas, including vicarious traumatization by witnessing severe injury and death. Following service duty, women veterans have heightened risk for intimate partner violence, other forms of physical assault, and severe relationship disturbances. The cumulative exposures to chronic stress and trauma, theoretically, should raise the risk for depression, PTSD, and related psychiatric disorders, as well as suicide. However, in a study by Tiet et al. (2006), only male veterans who were seeking treatment and who reported recent sexual abuse, recent physical abuse, and lifetime sexual abuse were significantly at risk for a recent suicide attempt. Although female patients were more likely than their male counterparts to experience sexual and physical abuse, these experiences were independent risk factors for recent suicide attempts only among men who were seeking treatment.

Other Civilian Trauma

Two studies that examined risk of suicide following natural disasters provide an interesting confirmation of the impact of unresolved stressors related to natural disasters, particularly in vulnerable populations. Following Hurricane Katrina, suicidal behaviors increased with time across the entire sample, which included the New Orleans metropolitan area, suggesting that suicidal behavior was widely distributed in the population nearly two years after the hurricane (Kessler et al., 2008). In contrast, six months after Hurricane Mitch, risk of suicide was confined to those individuals who were illiterate or those with a previous mental health problem (Caldera et al., 2001).

Another select population at risk for suicide following exposure to trauma are those who are either violent toward others or the recipient of violence. Blaauw et al. (2002) reported on traumatic events and suicide rates among jail inmates. Although all jail inmates reported a high prevalence of traumatic events, suicidal inmates reported a higher prevalence than did other inmates. Suicide risk in this population appeared to be related to the timing of the event—specifically whether the event(s) occurred during childhood, later life, or detention. In a study of dangerously violent adolescents living in the community, Flannery et al. (2001) found that while all of the adolescents in their sample reported higher levels of exposure to violence than did matched controls, dangerously violent females had significantly higher levels of suicide risk than did their male counterparts.

Summary

This review provides some highlights of the association between traumatic exposures and the risk of suicidal behaviors. Research can be extremely relevant for purposes of informing the development and implementation of programs and treatments that target particular populations. For children who have experienced sexual or physical abuse, it is important to consider that both genders are at risk for future suicidal behaviors. In particular, individuals with substance dependence may be at heightened risk if they also experienced traumatic experiences during childhood. The potential for protective factors to reduce the risk of suicidal behaviors in children with a history of sexual abuse provides a compelling argument for further research in this area. The literature from military and veteran populations provides evidence that these are important populations in which to consider assessing for suicidal behaviors. Although the lack of specificity about the nature of wartime exposures makes it difficult to identify particular subpopulations that may be at heightened risk, being wounded clearly demonstrates a graded increase in risk of suicide. Veteran populations from the current wars are clearly a priority for assessment and intervention. At the same time, Vietnam era veterans are an aging cohort, and therefore entering a time period during the life course when there is a known elevated risk for suicidal behaviors, especially among men. And finally, there is less information on the relationship between traumatic experiences in select populations, but it does appear that members of these groups warrant further investigations into potential interventions that could be delivered under special circumstances.

References

Hoyert, D.L., Arias, E., Smith, B.L., Murphy, S.L., & Kochanek, K.D. (2001). **Deaths: Final data for 1999.** *National Vital Statistics Reports, 49(8).* Hyattsville, Maryland: National Center for Health Statistics. Available from URL: http://www.cdc.gov/nchs/data/nvsr/nvsr49/nvsr49_08.pdf.

Knox, K.L., Conwell, Y., & Caine, E.D. (2004). **If suicide is a public health problem, what are we doing to prevent it?** *American Journal of Public Health, 94, 37-45.*

ABSTRACTS

Afifi, T.O., Enns, M.W., Cox, B.J., Asmundson, G.J.G., Stein, M.B., & Sareen, J. (2008). **Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences.** *American Journal of Public Health, 98,* 946-952. We sought to determine the fractions of psychiatric disorders and suicide ideation and attempts in a general population sample attributable to childhood physical abuse, sexual abuse, and witnessing domestic violence. Data were obtained from the US National Comorbidity Survey Replication. The estimated attributable fractions for psychiatric disorders attributable to having experienced any adverse childhood event ranged from 22% to 32% among women and 20% to 24% among men. Having experienced any adverse event accounted for a substantial proportion of suicide ideation and attempts among women (16% and 50%, respectively) and men (21% and 33%, respectively). Substantial proportions of poor mental health outcomes were also attributable to increasing number of adverse events. The estimated proportions of poor mental health outcomes attributed to childhood adversity were medium to large for men and women. Prevention efforts that reduce exposure to adverse childhood events could substantially reduce the prevalence of psychopathology and suicidal behavior in the general population. [abstract adapted]

Blaauw, E., Arensman, E., Kraaij, V., Winkel, F.W., & Bout, R. (2002). **Traumatic life events and suicide risk among jail inmates: The influence of types of events, time period and significant others.** *Journal of Traumatic Stress, 15,* 9-16. Relationships between traumatic life events and suicide risk were studied in two samples of jail inmates with a low (N = 216) and a high (N = 51) suicide risk. Although nonsuicidal inmates reported a high prevalence of traumatic life events, suicidal inmates reported even higher prevalence rates. Suicidal inmates reported more episodes of sexual abuse, physical maltreatment, emotional maltreatment, abandonment, and suicide attempts by significant others. They also had experienced more traumatic life events during childhood, later life, and detention. It is concluded that traumatic life events are associated with suicide risk and that such an association remains in a population with a high prevalence of traumatic life events. It is also concluded that suicide risk is dependent of the type of life event, the timing of the event, and the type of persons involved in the event.

Boehmer, T.K.C., Flanders, W.D., McGeehin, M.A., Boyle, C., & Barrett, D.H. (2004). **Postservice mortality in Vietnam veterans: 30-year follow-up.** *Archives of Internal Medicine, 164,* 1908-1916. During the 1980s, the postservice mortality component of the Vietnam Experience Study was conducted to examine the health effects of the Vietnam experience. A follow-up mortality investigation on this cohort was undertaken. Cox proportional hazards regression was used to calculate crude and adjusted rate ratios (RRs) for all-cause and cause-specific mortality, comparing Vietnam and non-Vietnam veterans. All-cause mortality was 7% higher in Vietnam vs non-Vietnam veterans during 30-year follow-up. The excess mortality among Vietnam veterans was isolated to the first 5 years after discharge from active duty and resulted from an increase in external causes of death. Cause-specific analyses revealed no difference in disease-related mortality. Vietnam veterans, however, experienced excess unintentional poisoning and drug-related deaths throughout follow-up. [abstract adapted]

Boscarino, J.A. (2006). **Posttraumatic stress disorder and mortality among U.S. Army veterans 30 years after military service.** *Annals of Epidemiology, 16,* 248-256. We examined all-cause and cause-specific mortality among a national random sample of 15,288 male U.S. Army veterans 16 years after completion of a telephone survey, approximately 30 years after their military service. These men were included in a national random sample of veterans from the Vietnam War Era. Our analyses adjusted for race, Army volunteer status, Army entry age, Army discharge status, Army illicit drug abuse, intelligence, age, and, additionally -- for cancer mortality -- pack-years of cigarette smoking. Adjusted postwar mortality for all-cause, cardiovascular, cancer, and external causes of death (including motor vehicle accidents, accidental poisonings, suicides, homicides, injuries of undetermined intent) was associated with PTSD among Vietnam Theater veterans. For Vietnam Era veterans with no Vietnam service (N = 7,364), PTSD was associated with all-cause mortality. PTSD-positive era veterans also appeared to have an increase in external-cause mortality. Vietnam veterans with PTSD may be at increased risk of death from multiple causes. The reasons for this increased mortality are unclear but may be related to biological, psychological, or behavioral factors associated with PTSD and warrant further investigation. [abstract adapted]

Brodsky, B.S., Mann, J.J., Stanley, B., Tin, A., Oquendo, M., Birmaher, B., et al. (2008). **Familial transmission of suicidal behavior: Factors mediating the relationship between childhood abuse and offspring suicide attempts.** *Journal of Clinical Psychiatry, 69,* 584-596. The current study investigates the relationship between reported childhood abuse and the familial transmission of suicidal behavior and other related risk factors. 507 offspring of 271 parent probands with DSM-IV major depressive disorder (MDD) were compared according to the reported childhood abuse history on demographic, diagnostic, and clinical variables related to risk for suicidal behavior. Both self-report and clinical interview measures assessed history of childhood physical and sexual abuse. Reported childhood sexual abuse, but not physical abuse, in the proband correlated with suicide attempts, PTSD, earlier onset of MDD, higher levels of impulsivity, and greater likelihood of childhood sexual abuse in the offspring and was rarely perpetrated by the affected parent. A reported history of childhood physical abuse was related to more lifetime aggression in the offspring. Transmission of suicide risk across generations is related to the familial transmission of sexual abuse and impulsivity. Sexual abuse is not directly transmitted by the victim to the next generation and may be related to family dynamics related to sexual abuse. [abstract adapted]

Brodsky, B.S., Oquendo, M., Ellis, S.P., Haas, G.L., Malone, K.M., & Mann, J.J. (2001). **The relationship of childhood abuse to impulsivity and suicidal behavior in adults with major depression.** *American Journal of Psychiatry, 158,* 1871-1877. In 136 depressed adult inpatients, the authors assessed trait impulsivity, aggression history, and number of lifetime suicide attempts as well as the medical lethality and the intent to die associated with the most lethal attempt. Subjects who reported an abuse history were more likely to have made a suicide attempt and had significantly higher impulsivity and aggression scores than those who did not report an abuse history. Impulsivity and aggression scores were significantly higher in subjects with a history of at least one suicide attempt. A logistic regression analysis revealed that abuse history remained significantly associated with suicide attempt status after adjustment for impulsivity, aggression history, and presence of borderline personality disorder. Abuse in childhood may constitute an environmental risk factor for the development of trait impulsivity and aggression as well as suicide attempts in depressed adults. [abstract adapted]

Bullman, T.A., & Kang, H.K. (1996). **The risk of suicide among wounded Vietnam veterans.** *American Journal of Public Health, 86,* 662-667. Risk of suicide for 34,534 veterans who were wounded in Vietnam was evaluated for severity of wound and number of times wounded. There was a trend of increasing risk of suicide with increased occurrence of combat trauma, the highest relative risk being observed for those veterans who were wounded more than once and hospitalized for a wound. In comparison with the US male general population, veterans hospitalized because of a combat wound or wounded more than once had a significantly increased risk of suicide. [abstract adapted]

Centers for Disease Control. (1987). **Postservice mortality among Vietnam veterans: The Centers for Disease Control Vietnam Experience Study.** *Journal of the American Medical Association, 257,* 790-795. The postservice mortality (through December 1983) of a cohort of 9324 US Army veterans who served in Vietnam was compared with that of 8989 Vietnam-era Army veterans who served in Korea, Germany, or the United States. Total mortality in Vietnam veterans was 17% higher than for other veterans. The excess mortality occurred mainly in the first five years after discharge from active duty (rate ratio, 1.45; 95% confidence interval, 1.08 to 1.96) and involved motor vehicle accidents, suicide, homicide, and accidental poisonings. Thereafter, mortality among Vietnam veterans was similar to that of other Vietnam-era veterans, except for drug-related deaths, which continued to be elevated. An unexpected finding was a deficit in deaths from diseases of the circulatory system among Vietnam veterans. The excess

in postservice mortality due to external causes among Vietnam veterans is similar to that found among men returning from combat areas after World War II and the Korean War.

Dube, S.R., Anda, R.F., Felitti, V.J., Chapman, D.P., Williamson, D.F., & Giles, W.H. (2001). **Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study.** *Journal of the American Medical Association, 286,* 3089-3096. To examine the relationship between the risk of suicide attempts and adverse childhood experiences (ACE), a retrospective cohort of 17,337 adult health maintenance organization members was studied. Participants completed a survey about childhood abuse and household dysfunction, suicide attempts (including age at first attempt), and multiple other health-related issues. The lifetime prevalence of having at least 1 suicide attempt was 3.8%. Adverse childhood experiences in any category increased the risk of attempted suicide 2- to 5-fold. The ACE score had a strong, graded relationship to attempted suicide during childhood/adolescence and adulthood. Compared with persons with no such experiences, the adjusted odds ratio of ever attempting suicide among persons with 7 or more experiences (35.2%) was 31.1. Adjustment for illicit drug use, depressed affect, and self-reported alcoholism reduced the strength of the relationship between the ACE score and suicide attempts, suggesting partial mediation of the adverse childhood experience–suicide attempt relationship by these factors. The population-attributable risk fractions for 1 or more experiences were 67%, 64%, and 80% for lifetime, adult, and childhood/adolescent suicide attempts, respectively. A powerful graded relationship exists between adverse childhood experiences and risk of attempted suicide throughout the life span. [abstract adapted]

Flannery, D.J., Singer, M.I., & Wester, K. (2001). **Violence exposure, psychological trauma, and suicide risk in a community sample of dangerously violent adolescents.** *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 435-442. *Objective:* To examine violence exposure, violent behaviors, psychological trauma, and suicide risk in a community sample of dangerously violent adolescents by comparison with a matched community sample of nonviolent adolescents. *Method:* Anonymous self-report questionnaires were administered in the 1992-1993 school year to students in grades 9 through 12, in six public high schools located in Ohio and Colorado (N = 3,735). From this sample, 484 adolescents (349 males, 135 females) who reported attacking someone with a knife or shooting at someone within the past year (i.e., dangerously violent adolescents) were drawn. Four hundred eighty-four controls were also selected and matched on gender, age in years, ethnicity, area of residence, and family structure. *Results:* Dangerously violent adolescents reported higher levels of exposure to violence and victimization than did matched controls. Dangerously violent females were more likely to score in the clinical range of depression, anxiety, posttraumatic stress, anger, and dissociation than were control females and violent males; they also had significantly higher levels of suicide potential. *Conclusions:* Students who have been known to commit violent acts should be adequately assessed for violence exposure and symptoms of psychological trauma, with special attention given to the suicide potential of violent females.

Fontana, A., Rosenheck, R., & Brett, E. (1992). **War zone traumas and posttraumatic stress disorder symptomatology.** *Journal of Nervous and Mental Disease, 180,* 748-755. The diagnosis and clinical understanding of posttraumatic stress disorder (PTSD) rests upon the explicit identification of traumatic experiences that give rise to a well-defined constellation of symptoms. Most efforts to investigate the characteristics of these experiences have attempted to specify war zone stressors as objectively as possible. In this study, we add specification of the psychological meaning of war zone stressors to their objective specification. Eleven traumas are organized in terms of four roles that veterans played in the initiation of death and injury; namely, target, observer, agent, and failure.

Kessler, R.C., Galea, S., Gruber, M.J., Sampson, N.A., Ursano, R.J., & Wessely, S. (2008). **Trends in mental illness and suicidality after Hurricane Katrina.** *Molecular Psychiatry, 13,* 374–384. A representative sample of 815 pre-hurricane residents of the areas affected by Hurricane Katrina was interviewed 5-8 months after the hurricane and again 1 year later as the Hurricane Katrina Community Advisory Group (CAG). The follow-up survey was carried out to study patterns-correlates of recovery from hurricane-related PTSD, anxiety-mood disorders and suicidality. Contrary to results in other disaster studies, where post-disaster mental disorder typically decreases with time, prevalence increased significantly in the CAG for PTSD (20.9 vs 14.9% at baseline), serious mental illness (SMI; 14.0 vs 10.9%), suicidal ideation (6.4 vs 2.8%), and suicide plans (2.5 vs 1.0%). The increases in PTSD-SMI were confined to respondents not from the New Orleans Metropolitan Area, while the increases in suicidal ideation-plans occurred both in the New Orleans sub-sample and in the remainder of the sample. Unresolved hurricane-related stresses accounted for large proportions of the inter-temporal increases in SMI (89.2%), PTSD (31.9%), and suicidality (61.6%). Differential hurricane-related stress did not explain the significantly higher increases among respondents from areas other than New Orleans, though, as this stress was both higher initially and decreased less among respondents from the New Orleans Metropolitan Area than from other areas affected by the hurricane. Outcomes were only weakly related to socio-demographic variables, meaning that high prevalence of hurricane-related mental illness remains widely distributed in the population nearly 2 years after the hurricane. [abstract adapted]

Roy, A., Hu, X.Z., Janal, M.N., & Goldman, D. (2007). **Interaction between childhood trauma and serotonin transporter gene variation in suicide.** *Neuropsychopharmacology, 32,* 2046-2052. Although the serotonin transporter promoter polymorphism (5-HTTLPR) contributes to depression and suicidality in a fashion modulated by environmental stress, 5-HTTLPR has been little examined in relation to suicidal behavior in substance dependence. Recently, a third functional allele of 5-HTTLPR was discovered enabling more of the interindividual variation in serotonin transporter expression to be predicted by genotype. We examined whether the 5-HTTLPR gene alone, or interacting with childhood trauma, was predictive of suicidal behavior in substance-dependent patients, a clinical population that is at high risk of suicide, as well as childhood trauma and other stress. We interviewed 306

abstinent male African-American substance-dependent patients about whether they had ever attempted suicide and administered the 34-item Childhood Trauma Questionnaire (CTQ). Patients and 132 male African-American controls were genotyped to determine the S, L(G), and L(A) 5-HTTLPR alleles; some analyses grouped the S and L(G) alleles on the basis of equivalent function. The distribution of 5-HTTLPR genotypes did not differ between patients and controls, nor between suicide attempters and non-attempters. However, patients with low expression 5-HTTLPR genotypes and above-median CTQ scores were more likely to have attempted suicide. Logistic regression showed increasing risk of a suicide attempt with increasing reports of childhood trauma scores; in addition, this increase was exaggerated among those with low expression forms of the 5-HTTLPR genotype. Childhood trauma interacts with low expressing 5-HTTLPR genotypes to increase the risk of suicidal behavior among patients with substance dependence.

Ryb, G.E., Soderstrom, C.A., Kufera, J.A., & Dischinger, P. (2006). **Longitudinal study of suicide after traumatic injury.** *Journal of Trauma: Injury, Infection and Critical Care, 61,* 799-804. To establish whether patients discharged from a trauma center experience an increased suicide rate and whether this can be explained by defined demographic, injury, or alcohol abuse risk factors, patients admitted between July 1, 1983, and June 30, 1995, and discharged alive from a Level I trauma center (n = 27,399) were followed for 1.5 to 14.5 years. Death determination was made by an epidemiologic support service, which had created a repository of death certificates. Variables used in the analyses included age, gender, race, Injury Severity Score, discharge disposition, mechanism of injury, and alcohol toxicology. General and trauma populations were compared using standard mortality rates. Risk factors for suicide within the trauma population were explored using Pearson's chi-square, Mantel-Haenszel chi-square, Cox proportional hazards, and Mantel-Cox log-rank methodology. Suicide was more common in the trauma than in the general population. This difference may be attributed primarily to alcohol use problems. Suicide risk in the trauma population increased with age from 25 to 44 years, male gender, Caucasian race, and positive alcohol toxicology. Disability (as measured by discharge disposition), but not injury severity, also seemed to have an influence on suicide rates. Interventions that address modifiable risk factors for suicide (substance abuse, psychiatric disorders, hopelessness, and social isolation) could benefit trauma patients known to be at higher risk for suicide, particularly those abusing alcohol. [abstract adapted]

Sarchiapone, M., Jaussent, I., Roy, A., Carli, V., Guillaume, S., Jollant, F., et al. (2009). **Childhood trauma as a correlative factor of suicidal behavior—via aggression traits. Similar results in an Italian and in a French sample.** *European Psychiatry, 24,* 57-62. Childhood trauma and aggressive traits are considered risk factors for suicidal behavior. Study participants comprise 587 subjects with different psychiatric diagnoses according to DSM-IV-TR criteria. Three different samples were analyzed and compared: 396 French suicide attempters, 103 Italian suicide attempters, and 88 Italian psychiatric controls. Patients were interviewed with the Brown-Goodwin Assessment for Lifetime History of Aggression and the Childhood Trauma Questionnaire (CTQ). When compared with the comparison group, Italian suicide attempters had significantly higher scores on the BGLHA scale and reported higher scores on the CTQ scores for physical abuse, sexual abuse, and emotional abuse. Significant correlations between childhood trauma and aggression were found in both groups, Italian and French, of suicide attempters. [abstract adapted]

Tiet, Q.Q., Finney, J.W., & Moos, R.H. (2006). **Recent sexual abuse, physical abuse, and suicide attempts among male veterans seeking psychiatric treatment.** *Psychiatric Services, 57,* 107-113. This study examined the rates of sexual and physical abuse and suicide attempts among male and female patients and focused on the associations between sexual and physical abuse and recent suicide attempts among men. Data were examined for a cohort of patients aged 19 years and older who were seeking treatment for substance use disorders, other psychiatric disorders, or both from the Department of Veterans Affairs (VA) between July 1997 and September 1997. Almost all the patients had a substance use disorder. The sample comprised 34,245 patients (33,236 males and 1,009 females). Compared with male patients, female patients were ten times as likely to have been sexually abused in the past 30 days and four times as likely to have been physically abused. Among male patients, bivariate analyses showed that those who had been recently sexually or physically abused were more likely than those who had not experienced such abuse to have attempted suicide recently (odds ratios of 4.8 and 3.0, respectively). After controlling for demographic and diagnostic factors, multivariate logistic regression analyses indicated that recent sexual abuse, recent physical abuse, and lifetime sexual abuse were significantly associated with a higher likelihood of a recent suicide attempt among male patients. Clinicians who identify suicide attempts and suicidal tendencies among male patients should routinely assess for sexual or physical abuse. [abstract adapted]

CITATIONS

Adams, D.M., & Lehnert, K.L. (1997). **Prolonged trauma and subsequent suicidal behavior: Child abuse and combat trauma reviewed.** *Journal of Traumatic Stress,10,* 619-634. In a review of studies that examine suicidal behavior in relationship to child abuse and combat trauma, the authors conceptualize traumatic stress as a person-environment interaction, and use this paradigm to discuss the characteristics of traumatic events, recovery environments, and individuals that may contribute to subsequent suicidality.

Bakalim, G. (1969). **Causes of death in a series of 4738 Finnish war amputees.** *Artificial Limbs, 13,* 27-36. As part of a larger analysis of the causes of death of 4,782 war amputees, the author determined that 63 of the 687 deaths occurring from 1945 to 1964 were due to suicide. The frequency was higher than expected for some time intervals, but lower than expected for others. Excess risk was strongest in the youngest cohort of amputees.

CITATIONS *continued*

Brodsky, B.S., & Stanley, B. (2008). **Adverse childhood experiences and suicidal behavior.** *Psychiatric Clinics of North America, 31,* 223-235. This article reviews correlational and familial transmission studies that explore the factors mediating the relationship between childhood abuse/neglect and suicidal behavior.

Bullman, T.A., & Kang, H.K. (1994). **Posttraumatic stress disorder and the risk of traumatic deaths among Vietnam veterans.** *Journal of Nervous and Mental Disease, 182,* 604-610. On the basis of data in the Agent Orange Registry (AOR), mortality risk of 4,247 Vietnam veterans with a diagnosis of PTSD relative to that of 12,010 Vietnam veterans with no diagnosis of PTSD was calculated using the Cox proportional hazards model. The PTSD veterans were more likely than the non-PTSD veterans to die from suicide and from accidental poisoning.

Caldera, T., Palma, L., Penayo, U., & Kullgren, G. (2001). **Psychological impact of the Hurricane Mitch in Nicaragua in a one-year perspective.** *Social Psychiatry and Psychiatric Epidemiology, 36,* 108-114. At four primary health care centers, 496 consecutive adult patients were interviewed 6 months after Hurricane Mitch. Of all respondents, 8.5% reported that they had thought of taking their lives. Illiterate adults and those with previous mental health problems were at particular risk for suicidal problems.

Dervic, K., Grunebaum, M.F., Burke, A.K., Mann, J.J., & Oquendo, M.A. (2006). **Protective factors against suicidal behavior in depressed adults reporting childhood abuse.** *Journal of Nervous and Mental Disease, 194,* 971-974. In a sample of 119 inpatients, suicide attempters differed from non-attempters in several ways, having younger age, greater depression severity, more signs of personality disorder, and fewer moral objections to suicide.

Eisenberg, M.E., Ackard, D.M., & Resnick, M.D. (2007). **Protective factors and suicide risk in adolescents with a history of sexual abuse.** *Journal of Pediatrics, 151,* 482-487. Using survey data from 83,731 students in Grades 6, 9, and 12, the authors found youth with a history of childhood sexual abuse to be at increased risk for suicide behaviors compared with other youth. When protective factors, especially family connectedness, were accounted for, the predicted probabilities of suicide behaviors for abused youth were substantially reduced.

Farberow, N.L., Kang, H.K., & Bullman, T.A. (1990). **Combat experience and postservice psychosocial status as predictors of suicide in Vietnam veterans.** *Journal of Nervous and Mental Disease, 178,* 32-37. The authors examined potential risk factors for suicide among 38 Vietnam veterans using 46 Vietnam veterans who died from motor vehicle accidents as a comparison group. No military service factor was associated with suicide. The extent of combat experience in Vietnam, as measured in this study, was not a good predictor of suicide death.

Hendin, H., & Haas, A.P. (1991). **Suicide and guilt as manifestations of PTSD in Vietnam combat veterans.** *American Journal of Psychiatry, 148,* 586-591. In a study of 100 Vietnam combat veterans, logistic regression analysis showed that combat guilt was the most significant predictor of both suicide attempts and preoccupation with suicide. For a significant percentage of the suicidal veterans, such disturbing combat behavior as the killing of women and children took place while they were feeling emotionally out of control because of fear or rage.

Keehn, R.J. (1980). **Follow-up studies of World War II and Korean conflict prisoners. III. Mortality to January 1, 1976.** *American Journal of Epidemiology, 111,* 194-211. Mortality through 1975 in US Army veterans released from prisoner-of-war camps following World War II (Europe, Pacific) and the Korean conflict and in several non-prisoner groups is compared using death rates and standard mortality ratios. Various causes of death, including suicide, are examined.

Nelson, E.C., Heath, A.C., Madden, P.A.F., Cooper, M.L., Dinwiddie, S.H., Bucholz, K.K., et al. (2002). **Association between self-reported childhood sexual abuse and adverse psychosocial outcomes: Results from a twin study.** *Archives of General Psychiatry, 59,* 139-145. Interview data collected from panel of adult Australian twins showed that childhood sexual abuse was associated with increased risk for adverse outcomes, controlling for family background. Discordant pair analysis seemed to provide an effective means of controlling for family background risk factors.

Seedat, S., Stein, M.B., & Forde, D.R. (2005). **Association between physical partner violence, posttraumatic stress, childhood trauma, and suicide attempts in a community sample of women.** *Violence and Victims, 20,* 87-98. In a survey of 637 women, women who had experienced intimate partner violence (IPV) were far more likely to have attempted suicide (23%) than were women who had not experienced IPV (3%).

Thomas, T.L., Kang, H.K., & Dalager, N.A. (1991). **Mortality among women Vietnam veterans, 1973-1987.** *American Journal of Epidemiology, 134,* 973-980. About 4,600 women Vietnam veterans and 5,300 women veterans who had never served in Vietnam were identified from military records and followed for vital status on December 31, 1987. There was a slight excess of mortality from external causes among women Vietnam veterans compared with non-Vietnam veterans, primarily due to an excess of motor vehicle accidents. Suicide rates were nearly the same in both cohorts.

Ystgaard, M., Hestetun, I., Loeb, M., & Mehlum, L. (2004). **Is there a specific relationship between childhood sexual and physical abuse and repeated suicidal behavior?** *Child Abuse and Neglect, 28,* 863-875. Interviews with 74 adults admitted to a general hospital after having made a suicide attempt showed high prevalences of severe sexual abuse (35%), severe physical abuse (18%), neglect (27%), and other major childhood stressors. Physical and sexual abuse were significantly and independently associated with repeated suicidal behavior.

It's not enough to find publications on PTSD and index them in the PILOTS Database. In order to make the database as useful as possible, we need to update our indexing records from time to time. There are several reasons why we do this.

As the traumatic stress literature grows, research and clinical practice take new directions. New populations are studied, new treatments are proposed and tested, new approaches to assessing and understanding traumatic disorders emerge. We follow these developments closely, with an eye to revising and extending the controlled vocabulary that we use to describe the subject content of the papers we index. These terms ("descriptors") are included in the PILOTS Thesaurus, and whenever we modify the Thesaurus we apply the changes retrospectively to all of the papers we have already indexed. This takes a lot of work on our part, but it means that database users don't have to determine when a new descriptor was adopted and then use both old and new descriptors in their searches.

Unlike most other databases, the PILOTS Database attempts to index all of an author's work under one form of his or her name. Some journals give each author's full name in article bylines, while others give only the surname and initials; and there are several other variations on this theme. We try to establish a single version of each author's name, one that is as complete as possible, and we use that for each of his or her publications regardless of how the name is given in a particular publication. As we discover more complete versions of author names, we replace shorter versions in our existing indexing records.

We also try to indicate the intellectual or bibliographic relationships among articles in the database. If a letter is published that comments on a previously published article, or a translation of an existing paper appears, we incorporate a note giving the relevant details in our indexing of the new publication — and we go back and insert a similar note in our indexing of the previous one. Sometimes this can get complex, as when several letters appear from different people or groups commenting on one or more articles, and these are printed together with replies from the original authors. We do our best to sort these out, so that PILOTS Database users will be able to follow up on criticisms and supplements to the articles they find when they search the database.

Recently we've been working on improving our existing indexing of non-English-language publications. When we have the necessary linguistic expertise available to us, we index these with the same level of care that we apply to papers in English. When we don't, we apply "limited indexing," which we base on what we can learn from the English abstract (if there is one) and from clues we identify in the text or the accompanying tables and figures. We have lately arranged for a German-speaking librarian to review and revise our indexing for some of this material. If this is successful, and if the necessary resources become available, we hope to extend this to material in other languages.

There is another language-related change that we are contemplating. A few months ago we changed the software that we use to enter records into the PILOTS Database. We adopted EndNote, which among other advantages accommodates UniCode and its vastly extended character set. Our previous software restricted us to the characters used in Western European languages. Now we have the ability to enter characters used in Polish, Serbian, Croatian, Slovenian, and Czech, as well as names and words in Cyrillic, Hebrew, Arabic, and other alphabets. UniCode even allows the use of characters from Chinese, Japanese, and other non-alphabetic languages. We don't expect to take advantage of these new abilities in the immediate future: not, at least, until we are sure that database users will be able to enter these characters in their search commands and read them on their computer screens. But that day will surely come, and when it does we shall have more of our existing records to change.

The traumatic stress literature is a growing and changing organism, and the PILOTS Database will have to grow and change with it.

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